Evaluation of Potable Water Quality in Pristina, Kosovo: A Student Project

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Water that is safe to drink is a global problem, particularly in developing countries and those ravaged by war and natural disasters. In the summer of 2005, US EPA scientists participated in the summer program at the University of Pristina, Kosovo, as co-teachers with a local university professor for a course in research planning and design. One of the projects conducted by the students during the three-week program examined the impact of the source on water quality for samples collected within the city and from several private wells. The project was a good introduction to research design and data analysis in a setting where the physical resources available to support research activities are very limited.

In Pristina, potable water is available during the day and early evening, but not between 11:00 p.m. to 6:00 a.m. due to limited treatment plant capacity. Intermittent loss of potable water can also occur during the day. The students collected samples from the source water, at the treatment plant, at different locations within the city, and from several private wells. The samples were evaluated for pH, turbidity, and the presence of coliform bacteria using simple tools (pH paper, visual examination of clarity, and donated materials for the bacteriological parameters). Source water samples and well samples contained coliform bacteria. Some samples drawn from within the city provided equivocal evidence for microbial contamination. All treated water systems had alkaline pHs (pH 7.0–7.5). Distance from the water treatment plant did not seem to affect the quality of the treated water for the measured parameters.

EDUCATIONAL SETTING:

Research Planning and Design

Summer University 2005

University of Pristina, Kosovo

Purpose: to allow the students to conduct a simple research project using minimal resources, analyze their data, and present the data to a panel of their peers for evaluation.

The students also developed a proposal for a project of their own design.

EXPERIMENTAL SETTING:

The city of Pristina receives treated water from two locations Badovc and Batllava. Due to insufficient capacity for both plants, no water is available from 11:00 PM until 6:00 AM each day and episodically during the day.

Nearby villages rely on private wells.

Diarrheal disease is common in Kosovo. Only 8.4% of the rural population has access to treated water. There is no wastewater treatment in Kosovo (UNMIC, 2003).

MATERIALS:

- Sample collection bottles (empty plastic soft drink and water bottles with caps)
- Disinfectant - tetraglycine hydroperiodide (16.7%)
- pH Paper – JT Baxter pH IX (0.5 pH unit calibration)
- IDEXX Colilert reagent: is used for the detection of coliforms and *E.coli* in water. Donated by IDEXX Laboratories Westbrook, Maine
- Incubator – warm weather, sunshine, and a box

METHODS:

- Wash all sample collection bottles, disinfect according to directions using a solution of tetraglycine hydroperiodide (16.7%).
- Rinse disinfected bottles with boiled, filtered tap water and replace the cap.
- Label bottles (Responsible person, location, date of sampling, pH measurement)
- Collect samples. Take pH measurement in the field.
- Refrigerate samples overnight.
- Laboratory work
- Visually examine sample for turbidity in a clear glass 6 in test tube.
- Reduce sample volume to that required for the Colilert test. Add the colilert powder and replace the cap on the sample collection bottle.
- Place the sample bottles in the improvised- box incubator and place outside in the direct sunlight (balcony of instructors lodgings).
- Incubate 48 hours (incubation period doubled to compensate for improvised incubation chamber.
- Record Colilert results. Samples positive for coliforms turn yellow. No UV lamp to test for E. coli was available.

RESULTS:

Sample Type	Samples	pH	Turbidity	Colilert Results	Comments
Source Water (Badovc) Lake)	1	7.0	Slight	Positive	
Sample from Badovc treatment plant	1	7.0	None	Negative	Moderate turbidity observed in the sample after incubation
Tap water samples from Pristina (Badovc)	3	7.0	None	Negative	2 samples showed slight turbidity after incubation
Tap water samples from Pristina (Batllova)	6	7.0 – 7.5	None	Negative	1 sample showed moderate turbidity after incubation and another showed strong turbidity
Village well samples	2	ND	ND	Positive	
ND = Not Determined					

CONCLUSIONS:

- The untreated sample from Bodocv and the two well samples tested positive for coliform bacteria using the Colilert test procedure.
- All of the tap water samples were negative for coliform bacteria.
- Several samples showed an increased in turbidity after the incubation period. All samples were visually free of turbidity at the time they were collected and when observed in the laboratory. Turbidity could be the result of microbial growth during the incubation period due to the presence of microbes in the samples or contamination during sample collection. Microscopic evaluation of the turbid samples was not possible because of time and resource limitations.
- The original variable tested was the impact of distance from the treatment plant. That variable was modified for this presentation. The water quality parameters measures showed no relationship to their distance from the treatment plant.

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